

The Center for Science Mathematics, and Technology Education (CSMTE)

Mission

The mission of the Center for Science, Mathematics, and Technology Education (CSMTE) is to strengthen the STEM education enterprise by:

1. Improving the quality and quantity of K-12 teachers of science and mathematics;
2. Providing strong experiences in science and mathematics for all K-16 students while increasing the number of graduates pursuing careers in STEM disciplines;
3. Creating a supportive environment for multidisciplinary research, evaluation, and assessment while bridging the gap between educators and STEM professionals; and
4. Encouraging community engagement that leads to increased university partnerships with school districts, business and industry, and the community.

Vision

The vision for the Center for Science, Mathematics, and Technology Education (CSMTE) is to leverage the resources of The University of North Carolina System, in partnership with the NC Department of Public Instruction (NC DPI), community, and schools to promote quantitative and scientific literacy for all North Carolina citizens. Through collaborations with these partners CSMTE translates the findings of educational research into best practices that benefit the science and mathematics education curriculum at all levels.

Action Plan

CSMTE

Center for Science, Mathematics, and Technology Education

1. Improving the quality and quantity of K-12 teachers of science and mathematics

In collaboration with teachers, schools, industry, and other stakeholders, CSMTE will design and deliver high quality research-based professional development programs in science and mathematics that enhance teacher learning and support North Carolina's educational priorities as well as the state and national standards in mathematics and science. These activities will include school-based and job-embedded learning and the development of instructional modules that can be delivered in a variety of ways, including electronically. The heart of this professional development will be STEM content delivered primarily by university faculty who have demonstrated interest in working with teachers and students. Activities also will focus on the teaching of thinking and problem-solving skills, science by inquiry, problem-based learning, the use of hands-on materials and manipulatives, and the use of technology.

Specifically, CSMTE professional development opportunities will strive to

- provide content instruction that is on-going and sustained
- be Standards based and on-site whenever possible
- bridge mathematics and science concepts
- integrate with other academic areas
- make use of hands-on science materials and mathematics manipulatives
- teach mathematics and science as a problem solving, inquiry venture
- be delivered over a period of days, weeks, or months in a variety of formats
- be especially supportive of new mathematics and science teachers from PK-12.
- be structured so that participants can use it as a springboard to licensure and advanced degrees or in obtaining National Board Certification
- be delivered on the new and developing programs in mathematics, science and technology so that teachers will be able to take the latest discoveries back into the classroom.

2. Providing strong experiences in science and mathematics to all K-16 students while increasing the number of graduates pursuing careers in STEM disciplines

CSMTE will collaborate with schools and school districts to improve student learning in science and mathematics and help eliminate achievement gaps. Specifically, CSMTE will

- provide training and outreach opportunities to enable faculty to be in direct contact with students in the classrooms of the teacher participants
- provide instructors with cutting-edge techniques to improve student learning
- provide training in using developmentally appropriate hands-on inquiry and problem-based instruction geared for all students with the goal of eliminating the achievement gap
- provide strategies to assist teachers in increasing parental involvement in mathematics and science

- recruit students into STEM careers through programs that ensure they are academically prepared to pursue and succeed in high-level mathematics- and science-based courses.
- promote interest and improve student achievement in mathematics and science so that students have increased options for post-secondary study and career opportunities by:
 1. encouraging student enrollment in rigorous mathematics, science, and technology classes
 2. promoting a climate of high expectations for all students
 3. engaging teachers and students in rigorous, original research in mathematics, science and technology
 4. sponsoring career events in mathematics, science and technology for local schools
 5. sponsoring STEM² workshops for girls
 6. sponsoring after-school/Saturday STEM² clubs in constituent communities
 7. sponsoring Math Fairs, Science Fairs, Science Olympiads, Odyssey of the Mind and other competitions in local communities, and
 8. working with informal science centers to involve more students and teachers in mathematics, science and technology

3. Creating a supportive environment for multidisciplinary research, evaluation, and assessment while bridging the gap between educators and STEM professionals

CSMTE will sponsor, conduct and disseminate research on professional development, teaching and learning in STEM education. It will serve in the eastern NC region as the center for knowledge of best practices and best methods of professional development in the teaching and learning of K-12 mathematics and science. Research will be conducted to understand how the knowledge how students learn math/science concepts then applied to improve current university curriculum efforts. Systematic program evaluation will aid in the development of professional development opportunities and programs that reflect current needs. Assessment tools will measure the change in teacher/student attitudes, teacher learning and student achievement. In addition, CSMTE will:

- work with faculty to seek external funds that support STEM educational research
- employ evaluation methods and instruments to assess the impact of its sponsored professional development programs and research
- develop and deliver high quality curricula for professional development providers.
- disseminate the results of CSMTE sponsored research in publications, presentations and web-based materials
- provide a collaborative environment for research and grant activity for visiting educators and faculty in residence

4. Encouraging community engagement that leads to increased university partnerships with school districts, business and industry, and the community

CSMTE will strengthen cross-program collaborations and partnerships, communicating with the state's mathematics and science teachers, school administrators, university personnel, STEM professionals and educational policy-makers about the STEM educational resources available for their growth and development. CSMTE will work with its constituents and with informal science institutions across the state to deliver mathematics and science content to the teachers and students of NC. By working with other universities, as well as business and industry, CSMTE will broaden the scope of its offerings and reach a more diverse population. CSMTE will serve the eastern NC region by sponsoring and participating in events that encourage and enrich mathematics and science literacy. Through networking and collaborating with regional, state and national organizations, CSMTE will educate its population about STEM disciplines and the important role that mathematics and science education play in the community's success.